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भारतीय मानक

पर्यावरण अवस्थाओं का वर्गीकरण

भाग 3 पर्यावरण पेरामीटर और उनकी कठोरताओं के समूहों का वर्गीकरण

अनुभाग 7 सुवाह्य और अस्थिर उपयोग

Indian Standard

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS

PART 3 CLASSIFICATION OF GROUPS OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

Section 7 Portable and Non-Stationary Use

(First Reprint AUGUST 2004)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

July 1993 **Price Group 11**

Environmental Testing Procedures Sectional Committee, LT 02

NATIONAL FOREWORD

This Indian Standard, which is identical with IEC Pub 721-3-7 (1987) 'Classification of environmental conditions — Part 3 : Classification of groups of environmental parameters and their severities. Portable and non-stationary use', issued by the International Electrotechnical Commission, was adopted by the Bureau of Indian Standards on the recommendation of the Environmental Testing Procedures Sectional Committee (LT 02) and approval of the Electronics and Telecommunication Division Council.

The text of the IEC standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

> Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

The concerned technical committee has reviewed the provisions of IEC 721-1 (1981), IEC 721-2 (1982), IEC 721-3-0 (1984), IEC 721-3-2 (1985), IEC 721-3-3 (1987) and IEC 721-3-4 (1987), referred in this standard and has decided that they are acceptable for use in conjunction with this standard.

Part 1 of this Indian Standard deals with classification of environmental parameters and their severities. The subsequent parts are intended to deal with the following:

a) Environmental conditions appearing in nature

b) Classification of groups of environmental parameters and their severities.

Amendment No. 1 issued to IEC Pub 721-3-7 (1987) is given at the end.

Only the English language text in the International Standard has been retained while adopting it in this Indian Standard.

IEC
721-3-7

Amendment 1

As in the Original Standard, this Page is Intentionally Left Blank

Page 8

Replace table IV by the following, where the two columns "7C1R" and "7C1L" have been inserted between the columns "Unit" and "7C1". The notes to the original table remain unchanged, but add: **5) 7C1R covers 3C1R, 7C1L covers 3C1L, 7C1 covers 3C1 and 4C1, 7C2 covers 3C2 and 4C2, 7C3 covers 3C3 and 4C3, 7C4 covers 3C4 and 4C4.**

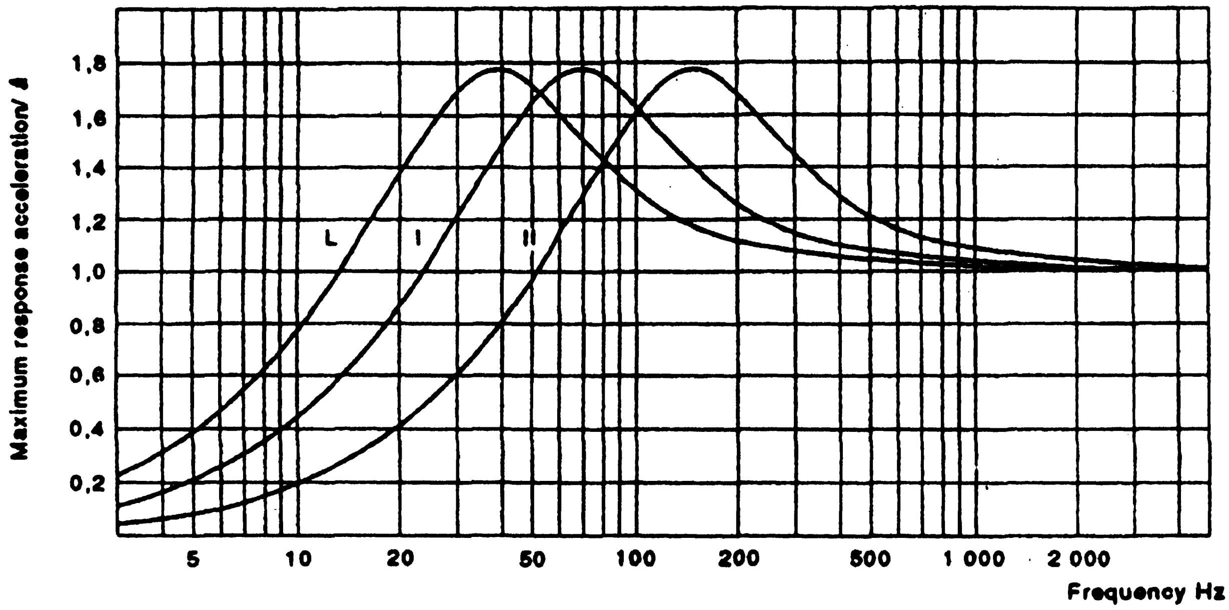
TABLE IV

Classification of chemically active substances

Environmental parameter	Unit1)	Catégorie2), 5)								
		7C1R	7C1L	7C1	7C2		7C33)		7C43)	
		Maximum value	Maximum value	Maximum value	Mean value	Maximum value	Mean value	Maximum value	Mean value	Maximum value
a) Sea salts	None	Negligible	Negligible	Negligible4)	Salt mist		Salt mist		Salt mist	
b) Sulphur dioxide	mg/m^3 cm^3/m^3	0,01 0,0037	0,1 0,037	0,1 0,037	0,3 0,11	1,0 0,37	5,0 1,85	10 3,7	13 4,8	40 14,8
c) Hydrogen sulphide	mg/m^3 cm^3/m^3	0,0015 0,001	0,01 0,0071	0,01 0,0071	0,1 0,071	0,5 0,36	3,0 2,1	10 7,1	14 9,9	70 49,7
d) Chlorine	mg/m^3 cm^3/m^3	0,001 0,00034	0,01 0,0034	0,1 0,034	0,1 0,034	0,3 0,1	0,3 0,1	1,0 0,34	0,6 0,2	3,0 1,0
e) Hydrogen chloride	mg/m^3 cm^3/m^3	0,001 0,00066	0,01 0,0066	0,1 0,066	0,1 0,066	0,5 0,33	1,0 0,66	5,0 3,3	1,0 0,66	5,0 3,3
f) Hydrogen fluoride	mg/m^3 cm^3/m^3	0,001 0,0012	0,003 0,0036	0,003 0,0036	0,01 0,012	0,03 0,036	0,1 0,12	2,0 2,4	0,1 0,12	2,0 2,4
g) Ammonia	mg/m^3 cm^3/m^3	0,03 0,042	0,3 0,42	0,3 0,42	1,0 1,4	3,0 4,2	10 14	35 49	35 49	175 247
h) Ozone	mg/m^3 cm^3/m^3	0,004 0,002	0,01 0,005	0,01 0,005	0,05 0,025	0,1 0,05	0,1 0,05	0,3 0,15	0,2 0,1	2,0 1,0
i) Nitrogen oxides (expressed in the equivalent values of nitrogen dioxide)	mg/m^3 cm^3/m^3	0,01 0,005	0,1 0,052	0,1 0,052	0,5 0,26	1,0 0,52	3,0 1,56	9,0 4,68	10 5,2	20 10,4

Page 10

Replace figure 1 by the following:



IEC [illegible]

Example of durations for half-sine pulse:

Spectrum type L: duration 22 ms
Spectrum type I: duration 11 ms
Spectrum type II: duration 6 ms

Figure 1 - Model shock response spectra (first order maximax shock response spectra). For explanation see note 6 relating to table I of IEC 721-1 (1990)

Page 17

***Replace** the table in A2.3 by the following where the two columns "7C1R" and "7C1L" have been added as first and second columns under the heading "Class". The note of the original table remains unchanged.*

A2.3 *C. Chemically active substances*

Condition of stationary use	Class								
	7C1R	7C1L	7C1	7C2		7C3		7C4	
	Maximum value	Maximum value	Maximum value	Mean value	Maximum value	Mean value	Maximum value	Mean value	Maximum value
a) Salts	Negligible	Negligible	Negligible	Salt mist		Salt mist		Salt mist	
b) Sulphur dioxide mg/m^3	0,01	0,1	0,1	0,3	1,0	5,0	10	13	40
c) Hydrogen sulphide mg/m^3	0,0015	0,01	0,01	0,1	0,5	3,0	10	14	70
d) Chlorine mg/m^3	0,001	0,01	0,1	0,1	0,3	0,3	1,0	0,6	3,0
e) Hydrogen chloride mg/m^3	0,001	0,01	0,1	0,1	0,5	1,0	5,0	1,0	5,0
f) Hydrogen fluoride mg/m^3	0,001	0,003	0,003	0,01	0,03	0,1	2,0	0,1	2,0
g) Ammonia mg/m^3	0,03	0,3	0,3	1,0	3,0	10	35	35	175
h) Ozone mg/m^3	0,004	0,01	0,01	0,05	0,1	0,1	0,3	0,2	2,0
i) Nitrogen oxides mg/m^3	0,01	0,1	0,1	0,5	1,0	3,0	9,0	10	20
Locations with stringently monitored and controlled atmosphere (clean room category)	X	X	X	X		X		X	
Locations with continuously controlled atmosphere		X	X	X		X		X	
Locations in rural and some urban areas with low industrial activities and moderate traffic			X	X		X		X	
Locations in urban areas with industrial activities or with heavy traffic			X	X		X			
Locations in immediate neighbourhood of industrial sources with chemical emissions						X		X	
Locations within industrial plants. Emissions of chemical pollutants in high concentrations								X	

Page 21

In A3.3:

a) ***Replace** four by six in the introductory passage.*

b) ***Insert**, after the introductory passage, the following:*

7C1R This class applies to use at, and direct transfer between locations with stringently monitored and controlled atmosphere (clean room category).

7C1L In addition to the conditions covered by Class 7C1R, this class applies to use at, and direct transfer between locations where the atmosphere is continuously controlled.

7C1 In addition to the conditions covered by Class 7C1L, this...

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Indian Standard

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS

PART 3 CLASSIFICATION OF GROUPS OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

Section 7 Portable and Non-Stationary Use

1. Scope

This standard classifies groups of environmental parameters and their severities to which products are subjected during portable and non-stationary use.

The environmental conditions covered by these groups include:

- the environmental conditions at locations where the product may be placed or used temporarily;
- the change of environmental parameters due to change of location;
- the environmental conditions related to transfer of the product between different locations.

The environmental conditions classified do not take into account the use profile of the product, i.e. whether the product is used only during a temporary stationary state, during the state of transfer or arbitrarily.

The conditions of portable and non-stationary use to which products may be exposed include land-based and offshore, weatherprotected and non-weatherprotected locations. The conditions further include transfer which is a part of the portable and non-stationary use.

The environmental conditions specified in this standard are limited to those which may directly affect the performance of products. Only environmental conditions as such are considered. No special description of the effects of these conditions on the product is given.

Environmental conditions directly related to fire or explosion hazards and conditions related to ionizing radiation are excluded. Any other unforeseen incidents are also excluded. The possibility of their occurrence should be taken into account in special cases.

Microclimate within a product is not included.

Conditions of stationary use, use in vehicles and ships, and conditions of storage and transportation are given in other parts of IEC Publication 721.

2. Object

To classify environmental parameters and their severities to which a product for portable and non-stationary use may be exposed under its use conditions, including periods of transfer, down time, maintenance and repair.

A limited number of classes of environmental conditions is given, covering a broad field of application. The user of this standard should select the lowest classification necessary for covering the conditions of the intended use.

3. General

For further general guidance, see IEC Publication 721-3-0.

Products in portable and non-stationary use are sometimes transferred from one location to another without being switched on. During this transfer the environmental conditions bearing on the product may affect the product in a different way than during operation. If environmental conditions during operation are considered separately from those during transfer, another class, e.g. a lower one, may be selected for this part of the use.

The severities specified are those which will have a low probability of being exceeded. All specified values are maximum or limit values. These values may be reached but do not occur permanently. Depending on the local situation there may be different frequencies of occurrence related to a certain period of time. Such frequencies of occurrence should be considered for any environmental parameter. They should additionally be specified if applicable. Information on duration and frequency of occurrence is given in Amendment No. 1 to Publication 721-3-0 as Clause 6.

Attention is drawn to the fact that combinations of the environmental parameters given may increase the effect on a product. This applies especially to the presence of high relative humidity in addition to biological conditions or to conditions of chemically or mechanically active substances.

The environmental conditions present at a location may be affected by other influences, e.g. heat dissipation sources, special process conditions, etc.

Measurements of the environmental conditions present at a location should be made at a representative point in the vicinity of the product.

It is recognized that extreme or special environmental conditions may exist. Specifications for products to operate under such special conditions are a matter of negotiation between supplier and user.

4. Definitions

In addition to the definitions in Clause 3 of IEC Publication 721-1, the following definitions apply to this standard:

4.1 *portable and non-stationary use*

The product is frequently moved from place to place. During transfer there is no special packaging for the product. The total transfer time may amount to a significant portion of the product's lifetime. The product is not permanently mounted on any structure or placed at a fixed site. The product may be operated while being either in a stationary or in a transfer state.

4.2 *weatherprotected location*

A location at which the product is protected from weather influences:

– *totally weatherprotected location:* (enclosed location)	direct weather influences are totally excluded;
– *partially weatherprotected location:* (sheltered location)	direct weather influences are not completely excluded.

4.3 *non-weatherprotected location*

A location at which the product is not protected from direct weather influences.

5. Classification of groups of environmental parameters and their severities

A number of classes for climatic conditions (K), special climatic conditions (Z), biological conditions (B), chemically active substances (C), mechanically active substances (S) and mechanical conditions (M) are specified in Tables I to VI.

This classification allows a number of possible combinations of environmental conditions, which bear upon products wherever used. It represents the real situation in respect of world-wide conditions of use, due to local influences of open-air climate, construction of buildings, mounting, process conditions, etc.

A class of conditions normally includes all classes with lower severity digits.

For certain parameters it has not yet been possible to specify quantitative severities.

For a given use or product, reference should be made to the total set of classes, e.g.

7K2/7Z1/7Z4/7B1/7C2/7S1/7M4

Appendix A explains the basis of the classes. It contains a summary of the conditions covered by each class and gives a survey of conditions affecting the choice of environmental parameters and their severities.

Appendix B contains a climatogram showing the interdependence of air temperature, relative humidity and absolute humidity.

Appendix C gives three examples for practical application of this classification.

5.1 *Climatic conditions*

The climatic conditions specified for classes 7K1 to 7K5 represent the conditions of portable and non-stationary use of products. They have been experienced world-wide over a long period of time taking into account all the parameters that can influence them, e.g. external (open-air) climatic conditions, type of building construction, temperature/humidity controlling systems, means of transfer and internal conditions, e.g. heat dissipation from other equipment, presence of humans, etc. The conditions should cover all normal cases, but not exceptional events.

When selecting appropriate classes attention should be paid to the fact that the climatic conditions inside buildings depend on the outside (open-air) conditions, especially air temperature and solar radiation, and the type of building construction. Walls with good thermal insulation or high thermal capacity can consistently smooth the peaks of outside air temperature variations between day and night, or exceptionally for a longer period. Walls with poor thermal insulation or low thermal capacity cannot have that effect, and peaks can be magnified due to the effect of solar radiation during the day and to the effect of building radiation at night. The effect of solar radiation can be increased by either heat-trap or greenhouse effects.

At non-weatherprotected locations the influence from special climatic conditions constitutes a more significant share of the effects bearing upon a product and its functional parts than at weatherprotected locations. Particularly the effects from temperature change, solar radiation, precipitation, air velocity, and wind-chill should be considered in this respect.

The severity of these effects may be influenced e.g. by constructional details (sort and thickness of material, colour of surface, sealing or breathing of casings, product heating, etc.), and by operating details (selection of operating site, consideration of degree of exposure to prevailing wind and weather, etc.).

5.2 *Special climatic conditions*

As in practice parameters such as heat radiation, movement of surrounding air and water from sources other than rain may occur with any of their severities in combination with any of the other climatic conditions, these special conditions are specified in Table II. In this case an assumption of the coincidence of events of increasing severity would lead to unnecessary overdesign.

5.3 *Biological conditions*

No quantitative severities have been specified for these conditions. The specified parameters of Table III are typical, but may not be complete.

5.4 *Chemically active substances*

Contamination of natural atmosphere is mainly caused by chemical emissions from industrial activities, motor-driven vehicles and heating systems. A further chemical influence is caused by aerosols of salts. The contamination may affect the function and the materials of products.

The values given in this classification have been experienced in surveys for several years. Maximum values are given, because direct influence of higher concentrations over a short period normally causes more damage to material, which cannot regenerate. Mean values are given additionally, because their influence may be important for the long-term effect on internal parts of the products.

In practice not all contaminants (parameters) classified in this standard are present simultaneously. Furthermore, the probability is low that the concentrations of those contaminants really present increase simultaneously and homogeneously. Depending on the local situation, there are often higher values of one contaminant only. The values specified for class 7C1 will normally be experienced in rural areas and areas with low industrial activities. The values specified for class 7C2 are experienced in urban areas. Therefore the severity of each of these two classes should be considered as the requirements for the combined effect of all parameters stated. The severities of classes 7C3 and 7C4, however, cannot be considered as the requirements for the combined effect of all parameters stated in order to avoid any uneconomical overdesign. For these classes it is possible to select only the severities of those single parameters which might be relevant in the case of application. If single parameters of the classes 7C3 and 7C4 are selected for the description of the chemically active substances present at a location, for all other parameters which are not specially named, the severities of class 7C2 are valid.

Note. — Chemically active liquids and chemically active solids other than sea salts or road salts are not considered in this standard.

5.5 *Mechanically active substances*

Sand and dust are classified together, as the effects caused by these environmental conditions are similar.

5.6 *Mechanical conditions*

The conditions of vibration (sinusoidal) are classified by severity levels of acceleration and displacement amplitudes in high and low frequency ranges respectively.

Random vibration is classified by severity levels of acceleration spectral density in frequency ranges.

Non-stationary vibration including shock is classified by using the first order undamped maximax shock response spectrum. See Sub-clause 5.3.1 of IEC Publication 721-1.

The conditions of free fall are classified by severity levels of fall heights depending on the mass of the product.

TABLE I

Classification of climatic conditions

Environmental parameter	Unit	Class[6]				
		7K1	7K2	7K3	7K4	7K5
a) Low air temperature	°C	+5	−5	−25	−40	−65
b) High air temperature	°C	+40	+45	+70	+70	+85
c) Low relative humidity[1]	%	5	5	5	5	4
d) High relative humidity[1]	%	85	95	100	100	100
e) Low absolute humidity[1]	g/m³	1	1	0.5	0.1	0.003
f) High absolute humidity[1]	g/m³	25	29	48	62	78
g) Rapid change of air temperature	°C/°C	+5/+25	−5/+25	−25/+30	−40/+30	−65/+30
h) Low air pressure[2]	kPa	70	70	70	70	30
i) High air pressure[3]	kPa	106	106	106	106	106
j) Rate of change of air pressure	kPa/min	Negligible	Negligible	Negligible	Negligible	6
k) Solar radiation	W/m²	700	700	1120	1120	1120
l) Heat radiation	None	[5]	[5]	[5]	[5]	[5]
m) Movement of surrounding air	m/s	[5]	[5]	[5]	[5]	[5]
n) Condensation	None	Yes	Yes	Yes	Yes	Yes
o) Precipitation (rain, snow, hail, etc.)	None	No	No	Yes	Yes	Yes
p) Rain intensity	mm/min	None	None	6	6	15
q) Low rain temperature[4]	°C	None	None	+5	+5	+5
r) Water from sources other than rain	None	[5]	[5]	[5]	[5]	[5]
s) Ice and frost formation	None	No	Yes	Yes	Yes	Yes

[1] The low and high relative humidities are limited by the low and high absolute humidities, so that for environmental parameters *a)* and *c)*, or *b)* and *d)*, the severities given in Table I do not occur simultaneously. See Appendix B for the relationship between air temperature and humidity.

[2] The value of 70 kPa represents a limit value for open-air conditions, normally at an altitude of 3000 m. In some geographical areas products may be used at higher altitudes.

[3] Conditions in mines are not considered.

[4] This rain temperature should be considered together with high air temperature *b)* and solar radiation *k)*. The cooling effect of the rain has to be considered in connection with the surface temperature of the product.

[5] Conditions occurring at the location concerned to be selected from Table II.

[6] The climatic classes of this standard include and cover climatic classes of IEC Publications 721-3-2, 721-3-3 and 721-3-4 as follows:

7K1 covers 2K1 and 3K3	7K3 covers 2K3 and 3K6 and 4K1	7K5 covers 2K5 and 3K8 and 4K4
7K2 covers 2K1 and 3K5	7K4 covers 2K4 and 3K7 and 4K2	

TABLE II

Classification of special climatic conditions

Environmental parameter	Class	Unit	Special condition Z
l) Heat radiation	7Z1	None	Negligible
	7Z2	None	Heat radiation, e.g. in the vicinity of heating systems
	7Z3	None	Heat radiation, e.g. in the vicinity of heating systems, commercial ovens or industrial furnaces
m) Movement of surrounding air[1]	7Z4	m/s	5
	7Z5	m/s	10
	7Z6	m/s	30
	7Z7	m/s	50
r) Water from sources other than rain[2]	7Z8	None	Negligible
	7Z9	None	Dripping water
	7Z10	None	Spraying water
	7Z11	None	Splashing water
	7Z12	None	Water jets
	7Z13	None	Water waves

[1] A cooling system based on non-assisted convection may be disturbed by adverse movement of surrounding air.

[2] Underwater conditions are not considered.

TABLE III

Classification of biological conditions

Environmental parameter	Unit	Class		
		7B1	7B2	7B3
a) Flora	None	Negligible	Presence of mould, fungus, etc.	Presence of mould, fungus, etc.
b) Fauna	None	Negligible	Presence of rodents and other animals harmful to products, excluding termites	Presence of rodents and other animals harmful to products, including termites

TABLE IV

Classification of chemically active substances

Environmental parameter	Unit[1]	Class[2]						
		7C1	7C2		7C3[3]		7C4[3]	
		Max. value	Mean value	Max. value	Mean value	Max. value	Mean value	Max. value
a) Salts	None	Negligible[4]	Salt mist					
b) Sulphur dioxide	mg/m^3 cm^3/m^3	0.1 0.037	0.3 0.11	1.0 0.37	5.0 1.85	10 3.7	13 4.8	40 14.8
c) Hydrogen sulphide	mg/m^3 cm^3/m^3	0.01 0.0071	0.1 0.071	0.5 0.36	3.0 2.1	10 7.1	14 9.9	70 49.7
d) Chlorine	mg/m^3 cm^3/m^3	0.1 0.034	0.1 0.034	0.3 0.1	0.3 0.1	1.0 0.34	0.6 0.2	3.0 1.0
e) Hydrogen chloride	mg/m^3 cm^3/m^3	0.1 0.066	0.1 0.066	0.5 0.33	1.0 0.66	5.0 3.3	1.0 0.66	5.0 3.3
f) Hydrogen fluoride	mg/m^3 cm^3/m^3	0.003 0.0036	0.01 0.012	0.03 0.036	0.1 0.12	2.0 2.4	0.1 0.12	2.0 2.4
g) Ammonia	mg/m^3 cm^3/m^3	0.3 0.42	1.0 1.4	3.0 4.2	10 14	35 49	35 49	175 247
h) Ozone	mg/m^3 cm^3/m^3	0.01 0.005	0.05 0.025	0.1 0.05	0.1 0.05	0.3 0.15	0.2 0.1	2.0 1.0
i) Nitrogen oxides (expressed in the equivalent values of nitrogen dioxide)	mg/m^3 cm^3/m^3	0.1 0.052	0.5 0.26	1.0 0.52	3.0 1.56	9.0 4.68	10 5.2	20 10.4

[1] The values given in cm^3/m^3 have been calculated from the values given in mg/m^3 and refer to a temperature of 20 °C and a pressure of 101.3 kPa. The table uses round values.

[2] Mean values are expected long-term values. Maximum values are limit or peak values, occurring over a period of time of not more than 30 min per day.

[3] It is not mandatory to consider each of classes 7C3 and 7C4 as a requirement for the combined effect of all parameters stated. If applicable, values of single parameters may be selected from these classes. In this case, the severities of class 7C2 are valid for all parameters not especially named.

[4] Salt mist may be present in sheltered locations of coastal areas and in offshore sites.

TABLE V

Classification of mechanically active substances

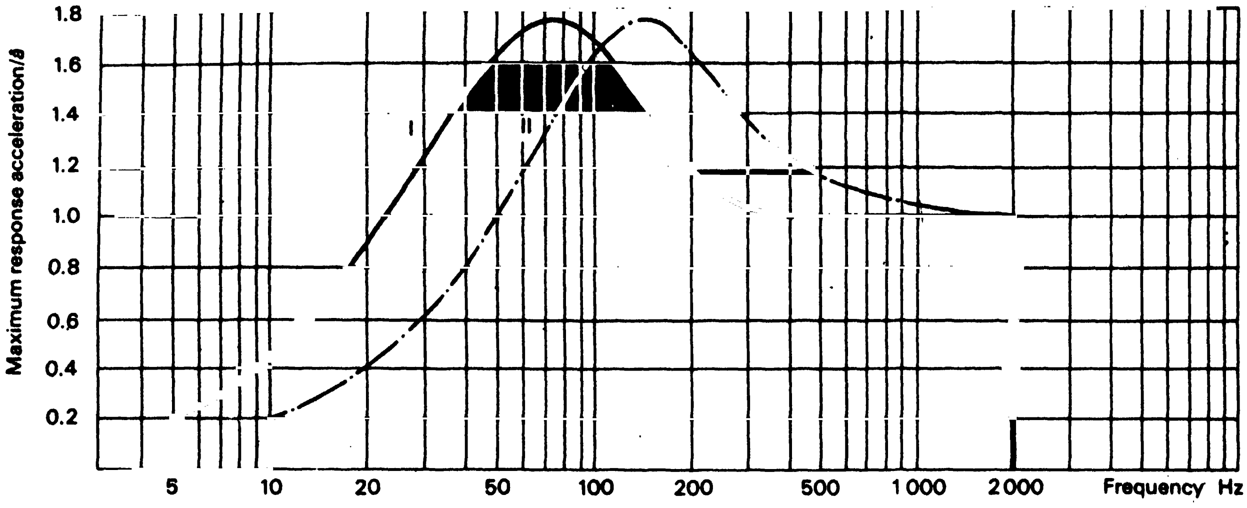
Environmental parameter	Unit	Class		
		7S1	7S2	7S3
a) Sand	mg/m^3	30	300	10 000
b) Dust (suspension)	mg/m^3	0.2	5.0	20
c) Dust (sedimentation)	mg/(m^2·h)	1.5	20	80

TABLE VI

Classification of mechanical conditions

Environmental parameter	Unit	Class		
		7M1	7M2	7M3
a) Stationary vibration, sinusoidal:				
displacement amplitude	mm	3.5	3.5	7.5
acceleration amplitude	m/s^2	10 15	10 15	20 40
frequency range	Hz	2-9 9-200 200-500	2-9 9-200 200-500	2-8 8-200 200-500
b) Stationary vibration, random:				
acceleration spectral density	m^2/s^3	1 0.3	1 0.3	3 1
frequency range	Hz	10-200 200-2000	10-200 200-2000	10-200 200-2000
c) Non-stationary vibration, including shock (see Figure 1, page 25):				
shock response spectrum type I				
peak acceleration $\hat{a}$	m/s^2	100	100	300
shock response spectrum type II				
peak acceleration $\hat{a}$	m/s^2	None	300	1000
d) Free fall:				
mass less than 1 kg				
fall height	m	0.025	0.25	1.0
mass between 1 kg and 10 kg				
fall height	m	0.025	0.1	0.5
mass between 10 kg and 50 kg				
fall height	m	0.025	0.05	0.25
mass more than 50 kg				
fall height	m	The severity is a matter of negotiation between supplier and user.		

Note. — The vibration levels and the frequency ranges stated in Table VI refer to the structural parts of the location. Products for portable and non-stationary use are not normally rigidly connected to these, and the nature of the specific product and location must be considered if these data are used for the design of a test specification.



Example of durations for half-sine pulse:

Spectrum type I: duration 11 ms
Spectrum type II: duration 6 ms

FIG. 1. — Model shock response spectra (first order maxima shock response spectra). For explanation, see Sub-clause 5.3 of IEC Publication 721-1.

APPENDIX A

SURVEY OF CONDITIONS AFFECTING THE CHOICE OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

A1. General

In this appendix the basis of the classes is explained. It gives a survey of conditions affecting the choice of environmental parameters and their severities, and it contains a summary of the conditions covered by each class.

A2. Survey of conditions

For each environmental parameter the various possible conditions, which will result in different levels of environmental conditions, are presented. The conditions are arranged in order of increasing severities.

The first column of the tabulated Sub-clauses A2.1 to A2.5 (pages 29 to 43) describes the conditions. In the vertical columns headed "Class", an × indicates the conditions covered by the class. The lowest class covering a certain condition may be found by reading horizontally from that condition to the first × encountered.

The procedure for finding an appropriate class as described above is valid for all the sub-clauses, but Sub-clause A2.1 (pages 29 to 35) contains the additional factor of type of climate, given in columns 2 to 10, which must be considered.

The lowest class covering a certain condition can thus be found by reading vertically down the relevant type of climate column to the first × in the horizontal line of the relevant condition, then reading horizontally to the right to the first × encountered as previously described.

The types of climate are described in IEC Publication 721-2-1 and are:

Extremely Cold (except the Central Antarctic)
Cold
Cold Temperate
Warm Temperate
Warm Dry
Mild Warm Dry
Extremely Warm Dry
Warm Damp
Warm Damp, Equable

It should be noted that, if a certain condition referred to in this appendix is covered by a certain class, it does not necessarily mean that the class describes, for each single parameter, the lowest environmental severity needed to cover the condition.

A2.1 *K. Climatic conditions*

Condition of use	Type of climate									Class				
	Extremely Cold	Cold	Cold Temperate	Warm Temperate	Warm Dry	Mild Warm Dry	Extremely Warm Dry	Warm Damp	Warm Damp, Equable	7K1	7K2	7K3	7K4	7K5
a) Low air temperature °C										+5	−5	−25	−40	−65
Temperature controlled, weatherprotected locations. Heating or cooling may be switched off for periods, but occurrence of extremely low temperatures is prevented	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Weatherprotected locations without temperature control. Heating may be used, where necessary, to avoid extremely low temperatures	×	×	×	×	×	×	×	×	×		×	×	×	×
Locations directly exposed to open-air climate. Locations in all types of buildings. Locations in compartments of means of ground transport. Locations in heated compartments of aircraft	 ×	 ×	 × ×	× × ×	× × ×	× × ×	× × ×	× × ×	× × ×			×	× ×	× × ×
b) High air temperature °C										+40	+45	+70	+70	+85
Temperature controlled, weatherprotected locations. Heating or cooling may be switched off for periods, but occurrence of extremely high temperatures is prevented	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Weatherprotected locations without temperature control. The building construction is designed, where necessary, to avoid extremely high temperatures	×	×	×	×	×	×	×	×	×		×	×	×	×
Weatherprotected locations without temperature control. The building construction provides protection from daily variations in outside (e.g. open-air) climate	× ×	× ×	× ×	× ×	 ×	 ×	 ×	 ×	× ×	×	×	× ×	× ×	× ×
Locations in all types of buildings. Locations in ventilated enclosures of means of transport	× ×	× ×	× ×	 ×	 ×	 ×	 ×	 ×	 ×	×	×	× ×	× ×	× ×
Locations directly exposed to open-air climate. Locations in unventilated enclosures of means of transport	× ×	× ×	× ×	× ×	× ×	× ×	 ×	× ×	× ×			×	×	× ×
c) Low relative humidity %										5	5	5	5	4
Any location	×	×	×	×	×	×	×	×	×	×	×	×	×	×

A2.1 *K. Climatic conditions (continued)*

Condition of use	Type of climate									Class				
	Extremely Cold	Cold	Cold Temperate	Warm Temperate	Warm Dry	Mild Warm Dry	Extremely Warm Dry	Warm Damp	Warm Damp, Equable	7K1	7K2	7K3	7K4	7K5
d) High relative humidity %										85	95	100	100	100
Continuously temperature controlled weather-protected locations. Dehumidification may be used, where necessary, to avoid extremely humid conditions	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Temperature controlled weatherprotected locations. Heating or cooling may be switched off for periods. Weatherprotected locations without temperature control. The building construction provides protection from daily variations in outside (e.g. open-air) climate. Locations in ventilated enclosures of means of transport for a limited time (not overnight)	×	×	×	×	×	×	×				×	×	×	×
	×	×	×	×	×	×	×	×	×			×	×	×
Locations directly exposed to open-air climate. Locations in all types of buildings. Locations in all means of transport	×	×	×	×	×	×	×	×	×			×	×	×
e) Low absolute humidity g/m^3										1	1	0.5	0.1	0.003
Temperature controlled weatherprotected locations. Heating or cooling may be switched off for periods. Additional humidification may be used, where necessary, to avoid extremely dry conditions	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Locations directly exposed to open-air climate. Locations in all types of buildings. Locations in all means of transport				×	×	×	×	×	×			×	×	×
			×	×	×	×	×	×	×				×	×
	×	×	×	×	×	×	×	×	×					×
f) High absolute humidity g/m^3										25	29	48	62	78
Temperature controlled weatherprotected locations. Weatherprotected locations without temperature control. The building construction provides protection from daily variations in outside (e.g. open-air) climate. Locations in ventilated enclosures of means of transport for a limited time (not overnight)	×	×	×	×	×	×	×			×	×	×	×	×
	×	×	×	×	×	×	×	×			×	×	×	×
	×	×	×	×	×	×	×	×	×			×	×	×
Locations in all types of buildings. Locations in ventilated enclosures of means of transport	×	×	×	×	×	×				×	×	×	×	×
	×	×	×	×	×	×	×				×	×	×	×
	×	×	×	×	×	×	×	×	×			×	×	×
Locations directly exposed to open-air climate	×	×	×	×	×	×	×	×	×			×	×	×
Locations in unventilated enclosures of means of transport	×	×	×	×	×	×		×	×				×	×
	×	×	×	×	×	×	×	×	×					×

A2.1 *K. Climatic conditions (continued)*

Condition of use	Type of climate									Class				
	Extremely Cold	Cold	Cold Temperate	Warm Temperate	Warm Dry	Mild Warm Dry	Extremely Warm Dry	Warm Damp	Warm Damp, Equable	7K1	7K2	7K3	7K4	7K5
g) Rapid change of air temperature °C										+5 +25	−5 +25	−25 +30	−40 +30	−65 +30
Temperature controlled weatherprotected locations. Heating or cooling may be switched off for periods, but occurrence of extreme temperatures is prevented. Transfer directly between such locations	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Weatherprotected locations without temperature control. Where necessary, heating may be used or building construction is designed to avoid extreme temperatures. Transfer directly between such locations	x	x	x	x	x	x	x	x	x		x	x	x	x
Locations directly exposed to open-air climate. Locations in ventilated enclosures of means of ground transport or heated compartments of aircraft. Locations in all types of buildings. Transfer directly between such locations	 x	 x	 x x	x x x	x x x	x x x	x x x	x x x	x x x			x	x x	x x x
Locations in unventilated compartments of means of transport including unheated aircraft holds. Transfer directly between such locations	x	x	x	x	x	x	x	x	x					x
h) Low air pressure kPa										70	70	70	70	30
Any location, excluding unpressurized aircraft compartments	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Any location, including unpressurized aircraft compartments	x	x	x	x	x	x	x	x	x					x
i) High air pressure kPa										106	106	106	106	106
Locations on surfaces vented to the surrounding atmosphere. Locations in pressurized compartments of aircraft	x	x	x	x	x	x	x	x	x	x	x	x	x	x
j) Rate of change of air pressure kPa/min										Negligible	Negligible	Negligible	Negligible	6
Any location, excluding unpressurized aircraft compartments	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Any location, including unpressurized aircraft compartments	x	x	x	x	x	x	x	x	x					x

A2.1 *K. Climatic conditions (continued)*

Condition of use	Type of climate									Class				
	Extremely Cold	Cold	Cold Temperate	Warm Temperate	Warm Dry	Mild Warm Dry	Extremely Warm Dry	Warm Damp	Warm Damp, Equable	7K1	7K2	7K3	7K4	7K5
k) Solar radiation W/m²										700	700	1120	1120	1120
Totally weatherprotected locations	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Locations directly exposed to open-air climate. Partially weatherprotected locations	×	×	×	×	×	×	×	×	×			×	×	×
l) Heat radiation (see Table II)										Z	Z	Z	Z	Z
Any location	×	×	×	×	×	×	×	×	×	×	×	×	×	×
m) Movement of surrounding air (see Table II)										Z	Z	Z	Z	Z
Any location	×	×	×	×	×	×	×	×	×	×	×	×	×	×
n) Condensation										Yes	Yes	Yes	Yes	Yes
Any location	×	×	×	×	×	×	×	×	×	×	×	×	×	×
o) Precipitation (rain, snow, hail, etc.)										No	No	Yes	Yes	Yes
Weatherprotected locations	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Non-weatherprotected locations	×	×	×	×	×	×	×	×	×			×	×	×
p) Rain intensity mm/min										None	None	6	6	15
Weatherprotected locations	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Non-weatherprotected locations	×	×	×	×	×	×						×	×	×
	×	×	×	×	×	×	×	×	×					×
q) Low rain temperature °C										None	None	+5	+5	+5
Weatherprotected locations	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Non-weatherprotected locations	×	×	×	×	×	×	×	×	×			×	×	×
r) Water from sources other than rain (see Table II)										Z	Z	Z	Z	Z
Any location	×	×	×	×	×	×	×	×	×	×	×	×	×	×
s) Ice and frost formation										No	Yes	Yes	Yes	Yes
Temperature controlled weatherprotected locations. Heating or cooling may be switched off for periods, but occurrence of low temperatures is prevented	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Any location	×	×	×	×	×	×	×	×	×		×	×	×	×

A2.2 *B. Biological conditions*

Condition of use	Class		
	7B1	7B2	7B3
a) Flora	Negligible	Presence of mould, fungus, etc.	Presence of mould, fungus, etc.
Locations with negligible risks of growth of mould, fungus, etc., or protected from growth of mould, fungus, etc.	×	×	×
Locations with risks of growth of mould, fungus, etc., and not protected from growth of mould, fungus, etc.		×	×
b) Fauna	Negligible	Presence of rodents and other animals harmful to products, excluding termites	Presence of rodents and other animals harmful to products, including termites
Locations with negligible risks of attacks by rodents and other animals, including termites, or protected from animals	×	×	×
Locations with risks of attacks by rodents and other animals, excluding termites, and not protected from animals		×	×
Locations with risks of attacks by rodents and other animals, including termites, and not protected from animals			×

A2.3 *C. Chemically active substances*

Condition of use		Class						
		7C1	7C2		7C3		7C4	
		Maximum value	Mean value	Maximum value	Mean value	Maximum value	Mean value	Maximum value
a) Salts		Negligible	Salt mist					
b) Sulphur dioxide	mg/m^3	0.1	0.3	1.0	5.0	10	13	40
c) Hydrogen sulphide	mg/m^3	0.01	0.1	0.5	3.0	10	14	70
d) Chlorine	mg/m^3	0.1	0.1	0.3	0.3	1.0	0.6	3.0
e) Hydrogen chloride	mg/m^3	0.1	0.1	0.5	1.0	5.0	1.0	5.0
f) Hydrogen fluoride	mg/m^3	0.003	0.01	0.03	0.1	2.0	0.1	2.0
g) Ammonia	mg/m^3	0.3	1.0	3.0	10	35	35	175
h) Ozone	mg/m^3	0.01	0.05	0.1	0.1	0.3	0.2	2.0
i) Nitrogen oxides	mg/m^3	0.1	0.5	1.0	3.0	9.0	10	20
Locations in rural and some urban areas with low industrial activities and moderate traffic		×	×		×		×	
Locations in urban areas with industrial activities or heavy traffic			×		×		×	
Locations in immediate neighbourhood of industrial sources with chemical emissions					×		×	
Locations within industrial process plants or emissions of chemical pollutants in high concentrations							×	

Note. — It is not mandatory to consider each of the classes 7C3 and 7C4 as a requirement for the combined effect of all parameters stated. If applicable, values of single parameters may be selected from these classes. In this case the severities of class 7C2 are valid for all parameters not specially named.

A2.4 *S. Mechanically active substances*

Condition of use		Class		
		7S1	7S2	7S3
a) Sand	mg/m^3	30	300	10 000
b) Dust (suspension)	mg/m^3	0.2	5.0	20
c) Dust (sedimentation)	mg/(m$^2 \cdot$ h)	1.5	20	80
Locations without special precautions to minimize the presence of sand and dust		×	×	×
Locations in proximity to sand and dust sources			×	×
Locations with processes producing sand or dust, or in geographical areas with high proportion of wind-driven sand or dust in air				×

A2.5 *M. Mechanical conditions*

Condition of use	Class		
	7M1	7M2	7M3
a) Stationary vibration, sinusoidal:			
displacement amplitude mm	3.5	3.5	7.5
acceleration amplitude m/s²	10 15	10 15	20 40
frequency range Hz	2-9 9-200 200-500	2-9 9-200 200-500	2-8 8-200 200-500
Locations with e.g. vibrations from machines placed or mounted on the same structure. Careful handling and transfer by humans (humans with low physical activities or not using other tools with high mechanical input at the same time). Transfer means are e.g. well-cushioned trolleys and carts, road vehicles in areas with well developed roads, trains with soft suspension, ships, aircraft	×	×	×
Locations with e.g. vibrations from machines placed or mounted on the same structure. Rough handling and transfer by humans (humans with high physical activities or using tools with high mechanical input at the same time). Transfer means are e.g. uncushioned trolleys and carts, road vehicles in areas without well developed road systems, trailers, trains with hard suspension			×
b) Stationary vibration, random:			
acceleration spectral density m²/s³	1 0.3	1 0.3	3 1
frequency range Hz	10-200 200-2000	10-200 200-2000	10-200 200-2000
Transfer by jet aircraft, air cushioned road vehicles, air cushioned trailers, other road vehicles in areas with well developed road systems, trains with soft suspension, forklift trucks (only 10 Hz to 500 Hz), etc.	×	×	×
Transfer by road vehicles in areas without well developed road systems, trailers, trains with hard suspension (only 10 Hz to 500 Hz), etc.			×
c) Non-stationary vibration, including shock:			
shock response spectrum type I			
peak acceleration $\hat{a}$ m/s²	100	100	300
shock response spectrum type II			
peak acceleration $\hat{a}$ m/s²	None	300	1000
Locations with e.g. shocks from other machines in the vicinity or mounted on the same structure, from ground blasting or pile-driving in the neighbourhood, slamming of doors, starting and stopping of machines. Careful handling and transfer by humans. Transfer means are e.g. well-cushioned trolleys and carts, aircraft, ships, well-cushioned road vehicles	×	×	×

A2.5 *M. Mechanical conditions (continued)*

Condition of use	Class		
	7M1	7M2	7M3
Locations with e.g. shocks from blasting or pile-driving, slamming of doors, starting and stopping of machines. Less careful handling and transfer by humans. Transfer means are e.g. trolleys and carts, road vehicles in areas with well developed road systems, trains with soft suspension	×	×	×
Locations with e.g. shocks from starting and stopping of machines. Rough handling and transfer by humans. Transfer means are e.g. uncushioned trolleys and carts, road vehicles in areas without well developed road systems (trailers excepted), trains with hard suspension			×
d) Free fall:			
mass less than 1 kg			
fall height m	0.025	0.25	1.0
mass between 1 kg and 10 kg			
fall height m	0.025	0.1	0.5
mass between 10 kg and 50 kg			
fall height m	0.025	0.05	0.25
mass more than 50 kg			
fall height m	The severity is a matter of negotiation between supplier and user.		
Careful handling and transfer, e.g. in laboratories, handling of sensitive products, etc.	×	×	×
Handling and transfer without special care, e.g. in workshops, offices, kitchens, etc.		×	×
Rough handling and transfer, e.g. in factories, process plants, construction works, use by handicapped persons, etc.			×

A3. Summary of conditions covered by the classes

This summary contains a description of the complete classification.

A3.1 *K. Climatic conditions*

These are covered by five class notations as follows. For types and groups of climates, see IEC Publication 721-2-1.

7K1 This class applies to use at, and direct transfer between temperature controlled enclosed locations. Humidity is not controlled.

Heating or cooling is used to maintain the required conditions, especially where there is a large difference between them and the open-air climate.

Products may be exposed to solar radiation, heat radiation, movements of surrounding air (e.g. due to draughts in buildings, process conditions, etc.), condensed water, and water from sources other than rain. They are not subjected to precipitation or formation of ice.

The conditions of this class may be found in, and during transfer to normal living and working areas, e.g. living rooms, rooms for general use (theatres, restaurants, etc.), offices, shops, workshops, telecommunication centres, storage rooms for valuable and sensitive products.

7K2 In addition to the conditions covered by class 7K1, the class 7K2 applies to use at, and direct transfer between enclosed locations having neither temperature nor humidity control.

Heating may be used to raise low temperatures, especially where there is a large difference between the conditions of this class and the open-air climate.

Products may be subjected to formation of ice.

The conditions of this class may be found in, and during transfer to e.g. entrances and staircases of buildings, garages, cellars, certain workshops, buildings in factories and industrial process plants, unattended equipment stations, certain telecommunication buildings, ordinary storage rooms for frost-resistant products, farm buildings, etc.

7K3 In addition to the conditions covered by class 7K2, the class 7K3 applies to:

- use at totally or partially weatherprotected locations in buildings of any construction, situated in geographical areas with Warm Temperate, Warm Dry, Mild Warm Dry, Extremely Warm Dry, Warm Damp, and Warm Damp, Equable types of climates,

- use at non-weatherprotected locations which are directly exposed to an open-air climate covered by the Restricted Group of Open-Air Climates,

- transfer between any of these locations.

7K4 In addition to the conditions covered by class 7K3, the class 7K4 applies to:

- use at totally or partially weatherprotected locations in buildings of any construction, situated in geographical areas with Cold Temperate, Warm Temperate, Warm Dry, Mild Warm Dry, Extremely Warm Dry, Warm Damp, and Warm Damp, Equable types of climate,

- use at non-weatherprotected locations which are directly exposed to an open-air climate covered by the Moderate Group of Open-Air Climates,

- transfer between any of these locations.

7K5 In addition to the conditions covered by class 7K4, the class 7K5 applies to:

- use at locations situated in geographical areas with open-air climates covered by the World-Wide Group of Open-Air Climates:
    - totally or partially weatherprotected in buildings of any construction,
    - non-weatherprotected directly exposed to the open-air climate,
- transfer between any of these locations, by any means, including transportation in unpressurized aircraft compartments.

A3.2 *B. Biological conditions*

These are covered by three class notations as follows:

7B1 This class applies to use at, and direct transfer between locations without particular risks of biological attacks. This includes protective measures, e.g. special product design, or installations in locations of such construction that mould growth, attacks by animals, etc., are not probable.

7B2 In addition to the conditions covered by class 7B1, the class 7B2 applies to use at, and direct transfer between locations where mould growth, or attacks by animals, except termites, may occur.

7B3 In addition to the conditions covered by class 7B2, the class 7B3 applies to use at, and direct transfer between locations where termites may occur.

A3.3 *C. Chemically active substances*

These are covered by four class notations as follows:

7C1 This class applies to use at, and direct transfer between locations in rural and urban areas with low industrial activities and moderate traffic.

In winter, heating methods in concentrated urban areas may cause increased contamination. Salt mist may be present in sheltered locations of coastal areas and in offshore sites.

7C2 In addition to the conditions covered by class 7C1, the class 7C2 applies to use at, and direct transfer between locations with normal levels of contaminants experienced in urban areas with industrial activities scattered over the whole area, or with heavy traffic.

7C3 In addition to the conditions covered by class 7C2, the class 7C3 applies to use at, and direct transfer between locations in the immediate neighbourhood of industrial sources with chemical emissions.

7C4 In addition to the conditions covered by class 7C3, the class 7C4 applies to use at, and direct transfer between locations within industrial process plants. Emissions of chemical pollutants in high concentrations may occur.

A3.4 *S. Mechanically active substances*

These are covered by three class notations as follows:

7S1 This class applies to use at, and direct transfer between locations without special precautions to minimize the presence of sand and dust.

7S2 In addition to the conditions covered by class 7S1, the class 7S2 applies to use at, and direct transfer between locations in close proximity to sand and dust sources.

7S3 In addition to the conditions covered by class 7S2, the class 7S3 applies to use at, and direct transfer between locations with processes producing sand or dust, or in geographical areas with high proportion of wind-driven sand or dust in air.

A3.5 *M. Mechanical conditions*

These are covered by three class notations as follows:

7M1 This class applies to use at, and direct transfer between locations with only low level vibrations, or with medium level shocks. The handling and transfer of products is with care.

7M2 In addition to the conditions covered by class 7M1, the class 7M2 applies to use at, and direct transfer between locations with high level shocks. The handling and transfer of products is with less care.

7M3 In addition to the conditions covered by class 7M2, the class 7M3 applies to use at, and direct transfer between locations with significant vibrations, or with high level shocks. The handling and transfer of products is rough.

APPENDIX B

INTERDEPENDENCE OF AIR TEMPERATURE, RELATIVE HUMIDITY AND ABSOLUTE HUMIDITY

B1. General

This appendix contains a climatogram (see Fig. B1) showing the interdependence of air temperature, relative air humidity and absolute air humidity by curves for constant absolute humidity and lines for temperature and relative humidity.

For a given value of absolute humidity, the corresponding value of relative air humidity at a certain air temperature within the temperature range of a class may be found at the point where the curve for constant absolute air humidity cuts the straight line for air temperature.

B2. Example

In class 7K3 the severity (limit value) for high absolute humidity is 48 g/m³. This means:

24% relative humidity at 70 °C,
38% relative humidity at 60 °C,
59% relative humidity at 50 °C,
94% relative humidity at 40 °C,
100% relative humidity at 38 °C.

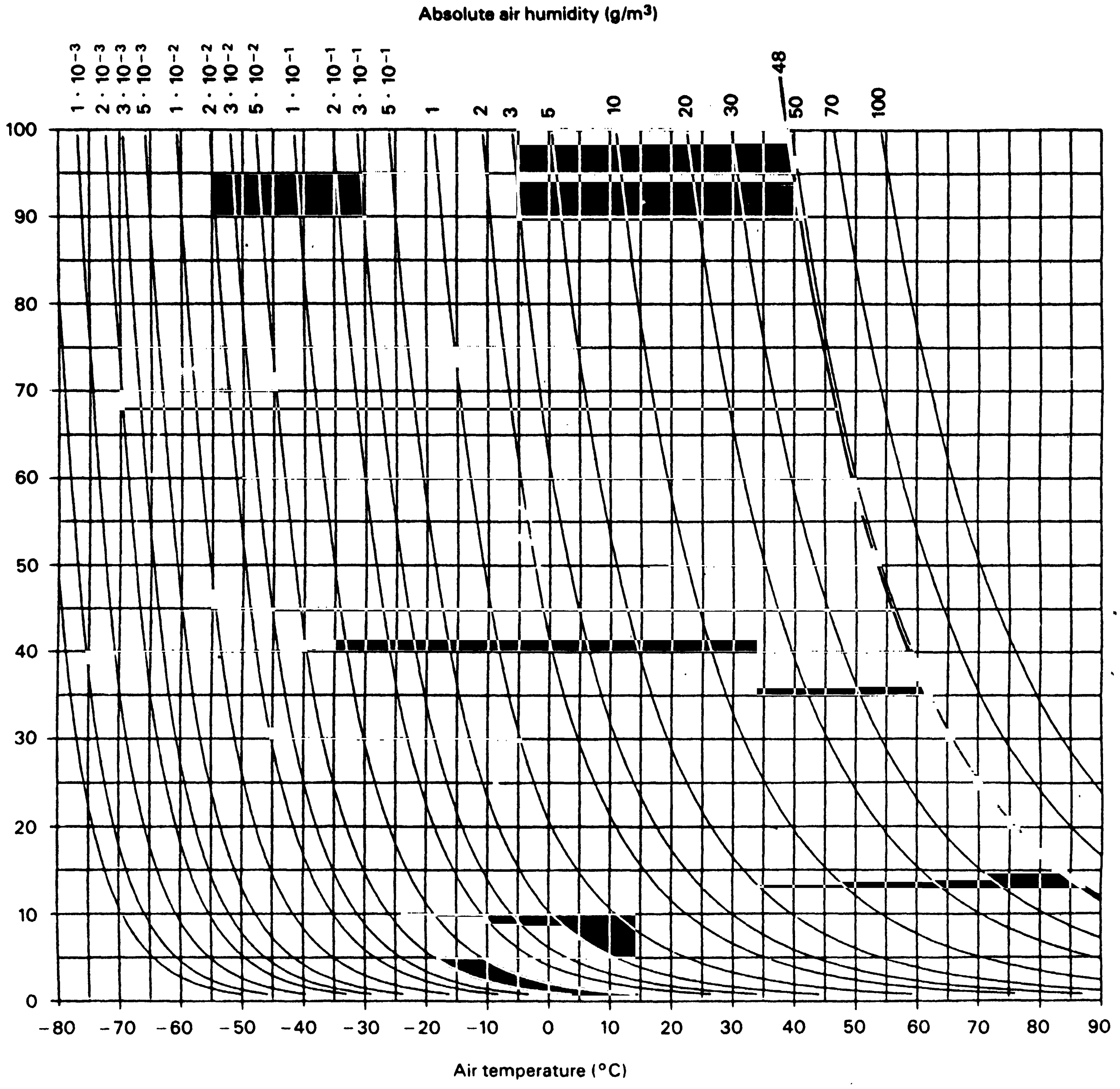


FIG. B1. — Climatogram.
Interdependence of air temperature, relative air humidity and absolute air humidity.

APPENDIX C

EXAMPLES FOR PRACTICAL APPLICATION OF THE CLASSIFICATION SPECIFIED IN THIS STANDARD

C1. General

These are examples of how to classify use conditions, or a product for use under certain conditions, in accordance with the classification given in this standard.

C2. Examples

Three examples are given to show how the user of a product may inform the supplier of a product about the environmental conditions under which the product is supposed to be operated. For types and groups of climates see IEC Publication 721-2-1.

C2.1 *Brief description of use conditions*

Product:

Laboratory instrument for reference measurements (high-precision voltmeter).

Portable and non-stationary use:

At totally weatherprotected locations with temperature control, situated in areas with open-air climatic conditions according to the World-Wide Group of Open-Air Climates.

Direct influence of open-air climatic conditions during use and transfer excluded.

Careful handling and transfer of product.

Classification:

The classes appropriate for the intended use are underlined in the table below:

K	Climatic conditions	7K1 7K2 7K3 7K4 7K5
Z	Special climatic conditions	7Z1 7Z2 7Z3 7Z4 7Z5 7Z6 7Z7 7Z8 7Z9 7Z10 7Z11 7Z12 7Z13
B	Biological conditions	7B1 7B2 7B3
C	Chemically active substances	7C1 7C2 7C3 7C4
S	Mechanically active substances	7S1 7S2 7S3
M	Mechanical conditions	7M1 7M2 7M3

Summary: 7K1/7Z1/7Z4/7Z8/7B1/7C2/7S1/7M1.

C2.2 *Brief description of use conditions*

Product: Hair dryer

Portable and non-stationary use:

a) At weatherprotected locations with temperature control, situated in areas with open-air climatic conditions according to the World-Wide Group of Open-Air Climates, heat radiation from heating systems may occur.

b) At weatherprotected locations without temperature control, situated in areas with Warm Temperate, Warm Dry, Mild Warm Dry, Warm Damp, and Warm Damp, Equable types of climate.

c) In open-air, in areas with Warm Temperate type of climate.

For *a)* and *b),* temporary direct influence of open-air climatic conditions is included (e.g. transfer between two weatherprotected locations).

For *a), b),* and *c),* handling and transfer of product without special care.

Classification:

The classes appropriate for the intended use are underlined in the table below:

K	Climatic conditions	7K1 7K2 7K3 7K4 7K5
Z	Special climatic conditions	7Z1 7Z2 7Z3 7Z4 7Z5 7Z6 7Z7 7Z8 7Z9 7Z10 7Z11 7Z12 7Z13
B	Biological conditions	7B1 7B2 7B3
C	Chemically active substances	7C1 7C2 7C3 7C4
S	Mechanically active substances	7S1 7S2 7S3
M	Mechanical conditions	7M1 7M2 7M3

Summary: 7K3/7Z2/7Z4/7Z8/7B2/7C2/7S1/7M2.

C2.3 *Brief description of use conditions*

Product: Walkie-talkie (hand-held) for professional use.

Portable and non-stationary use:

a) At weatherprotected locations (with or without temperature control), situated in areas with open-air climatic conditions according to the World-Wide Group of Open-Air Climates. Temporary direct influence of open-air climatic conditions is included (e.g. during transfer between two weatherprotected locations). Where applicable, heat radiation from heating systems may occur,

b) In open-air, in areas with open-air climatic conditions according to the Moderate Group of Open-Air Climates and with Extremely Warm Dry, Warm Damp, and Warm Damp, Equable types of climate.

For *a)* and *b)*, increased movement of surrounding air, and water from sources other than rain (e.g. spraying water) may occur.

Handling and transfer of product without special care, rough use conditions included.

Classification:

The classes appropriate for the intended use are underlined in the table below:

K	Climatic conditions	7K1 7K2 7K3 7K4 7K5
Z	Special climatic conditions	7Z1 7Z2 7Z3 7Z4 7Z5 7Z6 7Z7 7Z8 7Z9 7Z10 7Z11 7Z12 7Z13
B	Biological conditions	7B1 7B2 7B3
C	Chemically active substances	7C1 7C2 7C3 7C4
S	Mechanically active substances	7S1 7S2 7S3
M	Mechanical conditions	7M1 7M2 7M3

Summary: 7K4/7Z2/7Z6/7Z10/7B2/7C3/7S3/7M3.

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Amendment 1

Page 8

Replace table IV by the following, where the two columns "7C1R" and "7C1L" have been inserted between the columns "Unit" and "7C1". The notes to the original table remain unchanged, but add: 5) 7C1R covers 3C1R, 7C1L covers 3C1L, 7C1 covers 3C1 and 4C1, 7C2 covers 3C2 and 4C2, 7C3 covers 3C3 and 4C3, 7C4 covers 3C4 and 4C4.

TABLE IV

Classification of chemically active substances

Environmental parameter	Unit$^{1)}$	Catégorie$^{2), 5)}$								
		7C1R	7C1L	7C1	7C2		7C3$^{3)}$		7C4$^{3)}$	
		Maximum value	Maximum value	Maximum value	Mean value	Maximum value	Mean value	Maximum value	Mean value	Maximum value
a) Sea salts	None	Negligible	Negligible	Negligible$^{4)}$	Salt mist		Salt mist		Salt mist	
b) Sulphur dioxide	mg/m^3	0,01	0,1	0,1	0,3	1,0	5,0	10	13	40
	cm^3/m^3	0,0037	0,037	0,037	0,11	0,37	1,85	3,7	4,8	14,8
c) Hydrogen sulphide	mg/m^3	0,0015	0,01	0,01	0,1	0,5	3,0	10	14	70
	cm^3/m^3	0,001	0,0071	0,0071	0,071	0,36	2,1	7,1	9,9	49,7
d) Chlorine	mg/m^3	0,001	0,01	0,1	0,1	0,3	0,3	1,0	0,6	3,0
	cm^3/m^3	0,00034	0,0034	0,034	0,034	0,1	0,1	0,34	0,2	1,0
e) Hydrogen chloride	mg/m^3	0,001	0,01	0,1	0,1	0,5	1,0	5,0	1,0	5,0
	cm^3/m^3	0,00066	0,0066	0,066	0,066	0,33	0,66	3,3	0,66	3,3
f) Hydrogen fluoride	mg/m^3	0,001	0,003	0,003	0,01	0,03	0,1	2,0	0,1	2,0
	cm^3/m^3	0,0012	0,0036	0,0036	0,012	0,036	0,12	2,4	0,12	2,4
g) Ammonia	mg/m^3	0,03	0,3	0,3	1,0	3,0	10	35	35	175
	cm^3/m^3	0,042	0,42	0,42	1,4	4,2	14	49	49	247
h) Ozone	mg/m^3	0,004	0,01	0,01	0,05	0,1	0,1	0,3	0,2	2,0
	cm^3/m^3	0,002	0,005	0,005	0,025	0,05	0,05	0,15	0,1	1,0
i) Nitrogen oxides (expressed in the equivalent values of nitrogen dioxide)	mg/m^3	0,01	0,1	0,1	0,5	1,0	3,0	9,0	10	20
	cm^3/m^3	0,005	0,052	0,052	0,26	0,52	1,56	4,68	5,2	10,4

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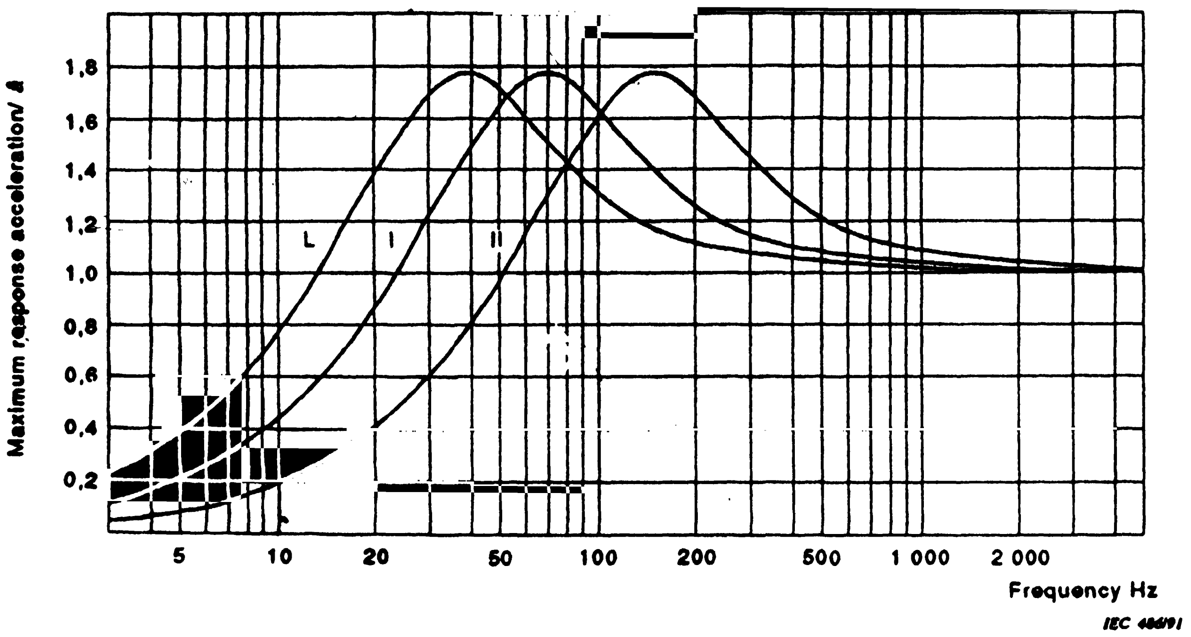
Replace figure 1 by the following:



***Example of durations for half-sine pulse*:**

Spectrum type L: duration 22 ms
Spectrum type I: duration 11 ms
Spectrum type II: duration 6 ms

Figure 1 - Model shock response spectra (first order maximax shock response spectra). For explanation see note 6 relating to table I of IEC 721-1 (1990)

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Replace the table in A2.3 by the following where the two columns "7C1R" and "7C1L" have been added as first and second columns under the heading "Class". The note of the original table remains unchanged.

A2.3 *C. Chemically active substances*

Condition of stationary use	Class								
	7C1R	7C1L	7C1	7C2		7C3		7C4	
	Maximum value	Maximum value	Maximum value	Mean value	Maximum value	Mean value	Maximum value	Mean value	Maximum value
a) Salts	Negligible	Negligible	Negligible	Salt mist		Salt mist		Salt mist	
b) Sulphur dioxide mg/m³	0,01	0,1	0,1	0,3	1,0	5,0	10	13	40
c) Hydrogen sulphide mg/m³	0,0015	0,01	0,01	0,1	0,5	3,0	10	14	70
d) Chlorine mg/m³	0,001	0,01	0,1	0,1	0,3	0,3	1,0	0,6	3,0
e) Hydrogen chloride mg/m³	0,001	0,01	0,1	0,1	0,5	1,0	5,0	1,0	5,0
f) Hydrogen fluoride mg/m³	0,001	0,003	0,003	0,01	0,03	0,1	2,0	0,1	2,0
g) Ammonia mg/m³	0,03	0,3	0,3	1,0	3,0	10	35	35	175
h) Ozone mg/m³	0,004	0,01	0,01	0,05	0,1	0,1	0,3	0,2	2,0
i) Nitrogen oxides mg/m³	0,01	0,1	0,1	0,5	1,0	3,0	9,0	10	20
Locations with stringently monitored and controlled atmosphere (clean room category)	X	X	X	X		X		X	
Locations with continuously controlled atmosphere		X	X	X		X		X	
Locations in rural and some urban areas with low industrial activities and moderate traffic			X	X		X		X	
Locations in urban areas with industrial activities or with heavy traffic			X	X		X			
Locations in immediate neighbourhood of industrial sources with chemical emissions						X		X	
Locations within industrial plants. Emissions of chemical pollutants in high concentrations								X	

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In A3.3:

a) *Replace* four *by* six *in the introductory passage.*

b) *Insert, after the introductory passage, the following:*

7C1R This class applies to use at, and direct transfer between locations with stringently monitored and controlled atmosphere (clean room category).

7C1L In addition to the conditions covered by Class 7C1R, this class applies to use at, and direct transfer between locations where the atmosphere is continuously controlled.

7C1 In addition to the conditions covered by Class 7C1L, this...

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